

WORKING PLAN FOR THE CONTINUATION
OF THE LODGEPOLE PINE - MOUNTAIN PINE BEETLE STUDY
DURING THE MONTHS OF MAY AND JUNE, 1927.

INTRODUCTION

The lodgepole pine - mountain pine beetle study was instituted in 1925. Mr. Gibson, who has been in charge of this study resigned from the Bureau in December, 1926, in order to undertake graduate work at the University of Minnesota. Due to the fact that Mr. Gibson will be unable to return to the Bureau until the latter part of June the responsibility of continuing this study has been placed upon Mr. Rust.

The purpose of this memorandum is to outline some of the details of the work and the principle data which should be secured. A brief description of the project has been included in this outline in order that the purpose of the work as planned can be understood.

EXPERIMENTAL PROJECT

In the hopes of developing a more economical method of control for *Dendroctonus monticolae* outbreaks in lodgepole pine, the following experiment was instituted on the East Fork of the Bitterroot River in 1925. It was hoped that if a maximum moisture content could be secured in the infested logs a condition would be set up which would be unfavorable to the development of the insect broods. To accomplish this a number of infested lodgepole pine and yellow pine were felled during the months of August and September, 1925.

These trees were limbed and the uninfested tops removed. Half of them were covered with brush while the others were left exposed. It was felt that by the removal of the limbs and tops all means of transpiration would be eliminated and the moisture content of the logs at that time maintained. Furthermore it was believed that by covering part of the logs with brush in order to shade them from the sun the moisture content would be still further protected. Though these trees were intensively examined during the 1926 season a detailed analysis of the data secured is not available due to the fact of Mr. Gibson's temporary resignation from the Bureau. However a general analysis would be to the effect that though a rather high moisture content in both yellow pine and lodgepole pine was secured it resulted in no great increase of the brood mortality. It was found however that a large percent of the broods on the top of the lodgepole pine logs, which were not covered with brush, had been destroyed by the drying out of the bark rather than by excess moisture. On the under side of these logs, though the moisture content was far above normal, the broods were in an apparently healthy condition and matured successfully though slightly delayed. By leaving one of these logs with the lower side exposed to the sun during the latter part of June it was found that the broods were destroyed in at least a few days and possibly a few hours. Though it is recognized that with a proper air temperature if trees were felled and exposed to the sun, the broods on the upper surface will be killed in a very short time, it is felt that perhaps

the excessive moisture beneath the bark would act as a favorable agency in this destruction.

These results suggested that perhaps a feasible and economical method of control would be to fell the infested trees in the fall of the year and then turn them the following June after the broods on the upper surface of the bole had been destroyed. In this connection a large number of infested lodgepole pine were cut during August and September, 1926, and were located so as to represent all sites and exposures. Half of these trees were left with the limbs and tops remaining. In addition to the felling of infested trees a number of lodgepole pine and yellow pine were "notch girdled" in a further test of the possibility of destroying the insect broods by the drying out of the trees while standing. The following list shows the different groups of treated trees, but for detailed location and method of treatment reference is made to the copy of Mr. Gibson's map and notes attached.

Lodgepole Pine*				
Group No.	Date Treated	Tree Numbers	Number of Trees	Type Exposure
1	8-26-26	1 - 10	10	Flat
2	8-26-26	11 - 21	11	North Slope
3	8-26-26	22 - 30	9	Flat
4	8-27-26	31 - 36	6	North Slope
5	8-27-26	37 - 51	15	West Slope
6	8-28-26	52 - 67	16	Flat
7	8-30-26	68 - 82	15	Flat
8	8-31-26	83 - 85	3	Flat
9	9- 2-26	86 - 103	18	East Slope
10	9- 2-26	104 - 110	7	North Slope
11	9- 2-26	111 - 121	12	West Slope
12	9- 3-26	122 - 136	15	South Slope
13	9-10-26	137 - 149	13	East Slope
14	9- 9-26	150 - 158	9	West Slope
15	9- 9-26	159 - 167	9	High Flat
16	9-14-26	168 - 185	18	NE and Flat

*47 of these trees were notch girdled.

Yellow Pine.*

Group No.	Date Treated	Tree Numbers	Number of Trees	Type Exposure
1	9 -3-26	1 - 12	12	North Slope
2	9--3-26	13 - 24	12	East Slope
3	9- 3-26	25 - 36	12	South Slope
4	9- 3-26	37 - 48	12	West
5	9- 3-26	49 - 50	2	High Flat
6	9- 4-26	51 - 55	5	High Flat
7	9- 4-26	56 - 59	4	Low Flat
8	9- 4-26	60 - 64	5	Low Flat
9	9- 4-26	65 - 70	6	Low Flat
10	9-14-26	71 - 76	6	North Slope

*All of these trees were notched girdled.

In the early examination of these trees the work will be confined to as few individuals as possible. This policy is adopted in an attempt to leave a large percent of the trees undisturbed for final examination during June. It is not intended that this outline, or schedule of work, be considered as manditory in character as undoubtedly there will be many situations arise which will require an immediate solution by the officer in charge of the work. In preparing this outline the fact that Mr. Rust will be alone until June 15th has been considered. Though it is realized that the amount of work planned for May and early June is rather meager in character and that it would be advantageous to increase the examination of the control trees by at least 100 percent, it is believed that the labor as outlined is all that one man can possibly perform. In this connection weather conditions have been considered.

OUTLINE OF WORK

I. Establishment of equipment for the recording of subcortical

temperatures in both the lodgepole pine and yellow pine trees treated in 1926 for experimental control.

A. Lodgepole Pine. (Felled).

1. Trees in groups #4, #7, and #9 should be selected for the securing of this data. These trees should have thicker bark than that which is found on the average tree so they will undoubtedly be of large diameters. The reason for selecting trees with thick bark is that it is believed that if a killing temperature is secured in well insulated individuals then the same condition would exist in those with thin bark.
 - a. Two trees should be selected from each group which should represent the two classes of treatment (trimmed and untrimmed). (Six Trees).
2. Thermometers should be placed under the bark on both the top and bottom sides of the log at a point approximately 8 feet from the bottom. The thermometers should be carefully placed so as to preserve the natural condition of the bark as much as possible and should be so embedded that the scale can be read without disturbing the instruments.

B. Lodgepole pine (Trees standing - notch girdled).

1. One tree in group #4 or group #7 should be selected with fairly thick bark. (One Tree).
2. Thermometers should be placed under the bark on both the north and south sides of the tree. The thermometers should be carefully placed so as to preserve the natural condition of the bark as much as possible, and should be so embedded that the scale can be read without disturbing the instruments.

C. Yellow Pine (Trees standing - notch girdled).

1. One tree from group #1 or group #7 should be selected which is fairly representative of the yellow pine in this region. (One Tree).
2. Thermometers should be placed under the bark on both the north and south sides of the tree. The

thermometers should be carefully placed so as to preserve the natural condition of the bark as much as possible and should be so embedded that the scale can be read without disturbing the instruments.

D. With each location of subcortical instruments an air thermometer should be hung nearby in accordance with the practices followed by the Weather Bureau.

1. Air thermometers should be checked against the maximum and minimum thermometer which has been previously checked with Weather Bureau instruments.

E. Readings.

Readings should be taken from these instruments each day throughout the month of May and June and possibly longer. This reading should preferably be at the warmest time of the day which would be between the hours of 2 and 4 p.m. A working schedule should be established so that these readings can be taken at the same time each day.

F. At the time the logs are permanently turned in order to destroy the broods on the lower side the readings shall still be taken from the upper and lower side. If turned 180 degrees there would be no need to reset the thermometers.

II. Examination of Control Trees.

A. Lodgepole Pine (Felled).

1. From groups #4, #7, and #9 two average trees should be selected from each for this examination. These should represent the trimmed and untrimmed methods of treatment. (Six Trees).
2. At 15 day intervals an intensive examination should be made of these trees. This examination is to be made by removing a strip of bark 1 foot wide from the entire circumference of the bole. This circumference is to be divided into quarters (top, sides, and bottom) and the data from each kept separate. Following each examination the trees should be returned to their original position. The following data is to be secured.

- a. Diameter of peeled strip near upper end.
 - b. Diameter outside bark just above peeled strip.
 - c. Total length of egg galleries.
 - d. Number of attacks.
 - e. Number of larvae and parent adults.
 - f. Record of parent adults activity.
 - g. Number of eggs, larvae, pupae and new adults.
 - h. Number of dead larvae, pupae and new adults.
 - i. Number of predacious larvae and adults, by names.
 - j. Record of presence of secondary insects, by names.
 - k. Percent of surface destroyed by secondary insects.
 - l. Percent of blue stain.
 - m. Condition of cambium, very dry, dry, medium, moist, wet.
3. The examination should be made at 5 feet intervals. The trunk of the tree should be measured off into 5 feet lengths. The first strip should be at the bottom of each section. At the time of the second examination 3 inches of bark should be left between the first strip and the strip removed for the second examination. This will permit of 4 examinations for each section with 3 inches of bark between each strip.
 4. At the time of each examination the data secured should be checked by felling a standing tree corresponding to the one examined in which a similar examination should be made. However as but one examination will be made of each check tree the strips should be located in the center of the 5 foot sections.
 5. To be sure that the treated tree selected for intensive examination is fairly representative of all of the control trees within each group, the data secured should be checked by the removal of a small section of bark (6"x12") from some of the other trees. Bearing in mind the leaving of as many trees as possible in an undisturbed condition, these check examinations should be made on different trees at different times.
 6. At such a time during June or early July that a killing temperature in the logs is secured, a rather intensive examination should be made of the upper sides of all the logs, in as many of the 16 groups as possible. If it is found that a reasonably high mortality of the brood on the upper side has occurred nearly all of the logs should be turned 180 degrees. It would be well to leave a log in each large group as a check against the results obtained.

B. Lodgepole pine (Standing and notch girdled).

1. To determine if there has been an abnormal mortality in the girdled trees during the winter one tree from each group, #4, #7, and #9 should be felled during the latter part of May and intensively examined.
 - a. The same method of examination should be followed and the same data secured as shown under II, A, 2.
2. The bole of the tree should be divided into 5 foot sections and the foot strip taken in the center of each.
3. At the time of the examination of each of these trees an adjacent ungirdled tree of approximately the same D.B.H. and degree of attack should be felled and examined in the same manner, as a check against the data secured.
4. As an assurance that the girdled tree selected for examination was representative of all of the trees treated in this manner within the group extensive basal examinations should be made of other trees in order to check against the data secured. If such a check shows a wide variation then it would be advisable to fell and examine other trees.
5. Late in June or early July intensive examinations should be made of as many of these girdled trees as possible in order to determine the final results obtained.
 - a. For these final examinations it may be advisable to divide the bole into $7\frac{1}{2}$ foot sections with one foot strip in the center of each.

C. Yellow Pine. (Trees standing - notch girdled).

1. To determine if there has been an abnormal mortality during the winter of the broods within yellow pine trees treated in this manner a tree from each group, #1 and #7, should be felled and intensively examined during the latter part of May.

- a. The same methods should be followed and the same data secured under II, A, 2.
2. The bole of the tree should be divided into $7\frac{1}{2}$ foot sections and a foot strip taken in the center of each.
3. At the time of the examination of each of these trees an adjacent ungirdled tree of approximately the same D.B.H. and degree of attack should be felled and examined in the same manner in order to check against the data secured.
4. As an assurance that the girdled tree selected for examination was representative of all the trees treated in this manner within the group extensive basal examinations should be made of other trees in order to check against the data secured. If a wide variation in the data is shown then it would be advisable to fell and examine other trees if possible.
5. Late in June or early July intensive examinations should be made of as many of these girdled trees as possible in order to determine the final results obtained.
 - a. For these final examinations it will be advisable to divide the log into 10 foot sections with one foot strip for each.

III. On the theory that the same results in this experiment could be secured by felling the trees in the spring instead of the fall it is planned to cut a series of trees at different times during the month of May. These trees will be felled and the limbs and tops removed from half of them.

- A. At 10 day intervals during the month of May, four average sized and well infested trees should be felled for each exposure. The trees should be numbered and all necessary tree data secured at the time of felling.
 1. No examination of these trees will be necessary during May. However after a few hot days have occurred during the month of June the upper surface of the bole should be examined (Regular strip examination) for a possible mortality of the broods. As soon as this mortality occurs the logs should be turned 180 degrees, and subsequently examined.

IV. To determine if the insect broods within lodgepole pine could be destroyed by the application or injection of a poison to the sap wood of the trees, 52 trees were treated with sodium arsenate and sodium arsenite early in September, 1926. The poison was applied by boring a slanting hole into the sap wood into which the dry powder was placed and the hole filled with water. Various manners of boring these holes and amounts of poison used were experimented with.

A. The examination of these trees will consist of a weekly check of the foliage discoloration during May and the early part of June. During the latter part of June these trees will need to be felled and an intensive strip examination made.

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In Charge of Coeur d'Alene Station.

Control Trees Cut in 1926 - To be Examined in 1927 - E. Fork - Bitterroot.
Lodgepole Pine. "Hack Girdled" should mean "Notch Girdled".

Group No. 1
8/26/26 - Flat Type.

Tree No.	Diam.	Treatment.
1	10.3	Trimmed
2	8.8	Trimmed
3	8.6	Untrimmed
4	11.4	Untrimmed
5	10.5	Trimmed
6	12.7	Untrimmed
7	11.3	Trimmed
8	8.0	Untrimmed
9	9.2	Trimmed
10	10.0	Trimmed

Group No. 2
8/26/26 - North Slope Type.

11	12.4	Trimmed
12	10.7	Untrimmed
13	9.6	Untrimmed
14	12.0	Trimmed
15	11.8	Trimmed
16	13.6	Untrimmed
17	13.7	Hack Girdled
18	15.8	Hack Girdled
19	13.7	Hack Girdled
20	9.5	Hack Girdled
21	8.9	Hack Girdled

Group No. 3
8/26/26 - "Jack Pot" on Flat.

22	9.5	Felled
23	11.8	Felled
24	11.8	Felled
25	10.8	Felled
26	10.2	Felled
27	10.1	Felled
28	11.0	Felled
29	11.7	Felled
30	11.0	Felled

Group No. 4
8/27/26 - North Slope Type
(North Slope opposite Francis' Ranch).

31	9.1	Trimmed
32	9.0	Untrimmed
33	10.8	Trimmed
34	11.5	Trimmed
35	12.0	Untrimmed
36	10.0	Untrimmed

Group No. 5.
8/27/26 - West Slope Type.
Meadow Creek.

Tree No.	Diam.	Treatment.
37	10.5	Trimmed
38	10.6	Untrimmed
39	10.0	Untrimmed
40	9.7	Trimmed
41	11.0	Untrimmed
42	9.2	Trimmed
43	9.8	Trimmed
44	10.4	Untrimmed
45	10.1	Trimmed
46	12.0	Hack Girdled
47	9.9	Untrimmed
48	13.0	Hack Girdled
49	11.3	Trimmed
50	9.5	Trimmed.

Group No. 5. (Above)
9/2/26 - West Slope.

51	9.9	Untrimmed
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Group No. 6.
8/28/26 - Flat Type East Side -
Mouth of Meadow Creek.

52	10.5	Untrimmed
53	10.5	Untrimmed
54	8.3	Trimmed
55	10.1	Untrimmed
56	12.8	Untrimmed
57	13.2	Hack Girdled
58	15.0	Hack Girdled
59	10.4	Untrimmed
60	9.7	Trimmed
61	10.2	Trimmed
62	12.0	Trimmed
63	10.0	Trimmed
64	13.6	Trimmed
65	11.3	Untrimmed
66	11.3	Hack Girdled
67	13.2	?

Group No. 7.
8/30/26 - Flat Type - Meadow Creek
West Side.

68	12.3	Untrimmed
69	9.3	Untrimmed
70	9.7	Trimmed
71	11.2	Trimmed
72	14.9	Untrimmed 8/31/26

Group No. 7 Cont'd.

Tree No.	Diam.	Treatment.
73	10.6	Trimmed
74	12.4	Untrimmed
75	6.1	Untrimmed
76	10.7	Hack Girdled
77	11.4	Hack Girdled
78	11.5	Hack Girdled
79	10.9	Hack Girdled
80	11.5	Hack Girdled
81	13.1	Hack Girdled
82	8.1	Hack Girdled

Group No. 8

8/31/26 - Flat Type - Meadow
Creek East side.

83	11.2	Hack Girdled
84	9.2	Hack Girdled
85	11.1	Hack Girdled

Group No. 9.

9/2/26 - East Slope Type -
Meadow Creek.

86	14.1	Hack Girdled
87	11.6	Trimmed
88	12.4	Untrimmed
89	10.2	Untrimmed
90	13.5	Hack Girdled
91	13.3	Trimmed
92	11.6	Untrimmed
93	11.5	Trimmed
94	12.5	Untrimmed
95	12.1	Hack Girdled
96	9.1	Trimmed
97	10.6	Hack Girdled
98	13.0	Untrimmed
99	11.9	Trimmed
100	12.4	Hack Girdled
101	11.7	Untrimmed
102	12.4	Trimmed
103	11.7	Hack Girdled

Group No. 10.

9/2/26 - North Slope Type - Same
as 31 to 36.

104	8.2	Trimmed
105	8.6	Untrimmed
106	9.1	Trimmed
107	7.0	Untrimmed
108	9.5	Trimmed
109	8.0	Untrimmed
110	8.3	Untrimmed

9/2/26 - West Slope Type.

Group No. 11.

Tree No.	Diam.	Treatment.
111	8.8	Untrimmed
112	11.8	Hack Girdled
113	11.4	Hack Girdled
114	11.6	Hack Girdled
114a	10.5	Untrimmed
115	10.4	Untrimmed
116	10.3	Trimmed
117	10.1	Hack Girdled
118	11.6	Hack Girdled
119	8.1	Trimmed
120	10.0	Hack Girdled
121	7.8	Untrimmed

Group No. 12

9/3/26 - South Slope Type
Ridge - South Francis.

122	10.1	Hack Girdled
123	10.4	Trimmed
124	9.9	Untrimmed
125	8.3	Trimmed
126	9.2	Untrimmed
127	9.3	Hack Girdled
128	9.9	Trimmed
129	11.6	Trimmed
130	8.4	Untrimmed
131	8.6	Untrimmed
132	10.1	Hack Girdled
133	12.9	Hack Girdled
134	10.7	Hack Girdled
135	11.3	Untrimmed
136	12.5	Trimmed

Group No. 13.

9/10/26 - East Slope Type.

137	11.6	Untrimmed
138	11.3	Trimmed
139	14.8	Hack Girdled
140	11.7	Untrimmed
141	12.7	Trimmed
142	10.5	Hack Girdled
143	10.4	Trimmed
144	13.5	Hack Girdled
145	10.2	Untrimmed
146	13.1	Untrimmed
147	12.1	Trimmed
148	12.2	Trimmed
149	10.3	Untrimmed.

Tree No. Diam. Treatment.

Group No. 14

9/9/26 East Slope Type. McCart's
Lookout. 100 yds North Camp.

150	9.3	Untrimmed
151	12.6	Hack Girdled
152	10.6	Trimmed
153	12.6	Hack Girdled
154	11.6	Untrimmed
155	12.3	Trimmed
156	11.0	Untrimmed
157	11.0	Hack Girdled
158	9.5	Trimmed

Group No. 15

9/9/26 - High Flat Type. About
40 yds West of McCart's Lookout
Trail and 125 yds. N. of Sheep C.

159	10.4	Hack Girdled
160	10.6	Untrimmed
161	9.7	Trimmed
162	12.0	Hack Girdled
163	12.0	Untrimmed
164	14.1	Trimmed
165	11.7	Hack Girdled
166	10.6	Untrimmed
167	10.7	Trimmed

Group No. 16.

9/14/26 - N.E. Slope and Flat Type.
Mouth Spring Creek about 100 yds.
East of redtop group. South side
River.

168	13.8	Hack Girdled
169	12.2	Trimmed
170	10.7	Untrimmed
171	10.5	Trimmed
172	13.9	Hack Girdled
173	11.9	Untrimmed
174	10.8	Trimmed
175	11.0	Untrimmed
176	12.1	Hack Girdled
177	12.1	Hack Girdled
178	13.2	Trimmed
179	10.7	Untrimmed
180	9.9	Hack Girdled
181	10.9	Trimmed
182	9.8	Hack Girdled
183	12.9	Untrimmed
184	8.3	Trimmed
185	9.0	Untrimmed.

Control Trees Cut in 1926 - To be Examined in 1927. E. Fork - Bitterroot.
Yellow Pine. All Notch Girdled.

Group No. 1
9/3/26 - North Slope Type.

Tree No.	Diam.	Remarks.
1	8.9	On ridge south of
2	12.9	Francis to east of
3	12.5	where trail comes
4	19.6	over ridge from river
5	21.0	and to north and north-
6	10.8	east of 1925 control
7	14.7	tree on north edge of
8	13.5	ridge.
9	9.1	Just to south of
10	16.2	greater part of con-
11	10.3	trol work on edge of
12	10.9	ridge and south of 1
		to 5.
		On ridge edge about $\frac{1}{2}$
		way between 1 and 9
		and Meadow Creek.

Group No. 2.
9/3/26 - East Slope Type.

13	7.7	On East side of ridge
14	9.3	south of Francis and in
15	14.5	low saddle where main
16	12.2	ridge turns south.
17	6.4	
18	7.8	
19	7.2	
20	17.7	
21	13.6	
22	11.6	
23	16.2	
24	13.3	

Group No. 3.
9/3/26 - South Slope Type.

25	10.5	In low saddle where
26	7.3	main ridge south of
27	8.9	Francis turn south. Not
28	10.7	quite $\frac{1}{2}$ mile from where
29	8.3	river trail from ranch
30	11.6	hits top of ridge.
31	13.9	
32	13.4	
33	9.0	
34	9.6	
35	9.5	
36	26.5	

Group No. 4
9/3/26 - West Slope Type.

Tree No.	Diam.	Remarks.
37	19.4	About 40 yards
38	9.3	south of where river
39	5.8	trail from ranch hit
40	7.7	top ridge south of
41	10.5	Francis.
42	9.0	
43	23.9	
44	16.0	
45	14.3	
46	11.2	
47	14.1	
48	9.7	

Group No. 5
9/3/26 - High Flat Type.

49	12.6	Where ridge south of
50	14.3	Francis makes turn to
		east.

Group No. 6
9/4/26

51	18.3	Ridge toward McCart
52	13.2	Lookout near big kil
53	6.4	of yellow pine.
54	9.1	
55	10.3	

Group No. 7
9/4/26 - Low Flat Type -
Bertie Ford.

56	13.0	
57	5.1	
58	10.9	
59	12.7	

Group No. 8
9/4/26 - Old Bug Camp Site -
Lowflat type.

60	11.9	
61	13.0	
62	12.9	
63	12.3	
64	15.4	

Tree No. Diam. Treatment.& Remarks.

Group No. 9

9/4/26 - Low Flat Type -
Cabin Flat.

65	19.5
66	8.5
67	10.0
68	17.4
69	14.5
70	15.3

Group No. 10

9/14/26 - North Slope Type.
Treatment

71	8.1	Untrimmed
72	8.2	Notch Girdled
73	8.4	Trimmed
74	8.3	Notch Girdled
75	18.0	Notch Girdled
76	15.0	Notch Girdled

At mouth of Springer
creek about 100 feet east
of redtop group to east
of Creek.

Sodium Arsenate Treatment of Trees
Sodium Arsenite Treatment of Trees.
Date of Treatment - 9/7/26.

Bored with 1/2 bit.
East Fork of Bitterroot.

Tree No.	Holes Bored	Species	Diam.	Amount poison per trees in tps.	Degree Hit.	Remarks.
Sodium Arsenate Used						
P-1	1	P.O	13	1		
P-2	2	P.O	13	1 1/2		
P-3	2	Y.P	8	1 1/2		
P-4	1	P.O	13	2		Sorrel Top
P-5	1	Y.P	18	2	Heavy	Some poison spilled Green.
P-6	2	P.O	9	1 1/2		
P-7	2	P.O	12	1	Heavy	
P-8	2	Y.P	8	2	Very Heavy	
P-9	1	P.O	10	1	Medium	One side partly green
P-10	2	P.O	11	1	Heavy	North side cat-faced
P-11	1	P.O	10	1 1/2	Heavy	" " " "
P-12	2	P.O	10	1 1/2	Medium	West " " " "
P-13	1	P.O	11	1 1/2	Medium	
P-14	2	P.O	9	1 1/2	Very Light	N.E. " " "
P-15	2	P.O	15	2	Heavy	
P-16	1	P.O	11	1	Heavy	
P-17	2	P.O	13	1	Heavy	
P-18	2	P.O	14	2	Heavy	
P-19	2	P.O	12	2	Heavy	
Sodium Arsenite Used						
P-20	2	P.O	12	1	Heavy	for tree P-20 only
P-21	2	P.O	11	3	Light	No Attack west side
P-22	2	P.O	12	1	Very Heavy	No. 22 to 29
P-23	1	P.O	8	1	Medium	Across river from
P-24	2	P.O	10	2	Light	Francises.
P-25	2	P.O	11	1	Medium	
P-26	2	P.O	14	3	Heavy	
P-27	1	P.O	8	1 1/2	Heavy	
P-28	2	P.O	13	4	Heavy	
P-29	2	P.O	14	3	Very Heavy	
P-30	2	P.O	18	4	Very Heavy	Sodium Arsenite Use
P-31	2	P.O	13	1	Very Heavy	from P-30 to P-32.
P-32	1	P.O	12	1 1/2	Very Heavy	(Ipssin top
P-33	1	P.O	11	2	Heavy	
P-34	1	P.O	11	3	Heavy	
P-35	1	P.O	12	4	Light	
P-36	2	P.O	12	1 1/2	Light	Green Top
P-37	2	P.O	12	1	Heavy	" "
P-38	2	P.O	12	3	Heavy	Green Crown
P-39	2	P.O	12	3	Heavy	Light attacks s.w.
P-40	2	P.O	13	4	Medium	Light attacks side
P-41	2	P.O	12	1 1/2	Heavy	Green Crown
P-42	2	P.O	11	1	Heavy	Green Crown
P-43	2	P.O	11	2	Heavy	Green Crown
P-44	2	P.O	13	3	Heavy	Green Crown

Sodium Arsenite Treatment of Trees Cont'd.

Tree No.	Holes Bored	Species	Diam.	Ant. poisoned per tree in tps.	Detree hit.	Remarks.
P-45	2	P.O	12	4	Medium	Green Crown.
P-46	1	P.O	13	$\frac{1}{2}$	Heavy	" "
P-47	1	P.O	13	1	Heavy	" "
P-48	1	P.O	11	2	Heavy	" "
P-49	1	P.O	12	3	Heavy	" "
P-50	1	P.O	12	4	Heavy	" "
P-51	2	P.O	11	1	Unattacked	Green
P-52	2	P.O	12	1	"	"

Mapped by Gibson 1926

Scale: 4 inches = 1 mile.

